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REMARKS

Claim 1 is amended, incorporating the features of claim 2, and supported by, for example, page 6, line 14 to page 7, line 1 of the Specification. Claim 2 has been canceled to track with revision to claim 1. Claims 1, 3-9, 18-20, and 23 are amended editorially. In claims 1 and 19, "sectional area reduction ratio" is replaced by "drawing ratio" for consistency, as the Specification uses the terms interchangeably. There is no new matter.

Claims 1, 3-23 remain pending. Reconsideration and reexamination of the application are requested.

Status of Claims

The Office Action stated that claims 10-17, 21, and 22 were cancelled in the response to the restriction requirement filed on January 19, 2007. Applicants respectfully disagree. Claims 10-17, 21, and 22 were withdrawn in the response to the restriction requirement filed on January 19, 2007. Status of claims 10-17, 21, and 22 are properly acknowledged in the Disposition of Claims of the Office Action. Applicants respectfully request acknowledgement of proper status of claims 10-17, 21, and 22.

Claim Objections

As advised by the Examiner, claims 1, 3, 4, 8, 18, and 19 were amended editorially to conform generally with U.S. formalities. Particularly, claims are revised as follows:

In claims 1, 3, and 19, the terms "spherodizing" are deleted and replaced with "spheroidizing."

In claim 4, the term "les" is deleted and replaced with "less."

In claim 8, the terms "in" in line 1 and "cooper" in line 4 are deleted and replaced with "is" and "copper" respectively.

In claim 18, the term "mad" is deleted and replaced with "made."

Claim Rejections - 35 USC 112

Claim 9 was rejected under 35 USC 112, second paragraph, because the phrase "for by" in line 2 of the claim. The grammatically awkward phrase "for by" is deleted and replaced with

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"include." The amendment is editorial in nature. Accordingly, there is no new matter. Applicants respectfully request reexamination of claim 9.

Claim Rejections - 35 USC 103

Claims 1-3 were rejected under 35 USC 103(a) as being unpatentable over JP 61-129246 in view of Tomioka et al. (US 3532560). Applicants do not concede the correctness of the rejection.

The rejection states that Fig. 2 of JP 61-129246 discloses a method of manufacturing a billet for cold forging comprising: annealing a blank of medium carbon steel, drawing the blank, annealing the drawn blank to form a billet; and cutting the billet. Applicants respectfully disagree.

Fig. 2 of JP 61-129246 is a block diagram illustrating four possible methods:

1 - 2 - 3 - 4 - 5 - 6 - 7 - 8 - 9 - 10;

1 - 2 - 3 - 4 - 14 - 5 - 6 - 7 - 8 - 9 - 10;

1 - 2 - 3 - 11 - 12 - 13 - 4 - 5 - 6 - 7 - 8 - 9 - 10; and

1 - 2 - 3 - 11 - 12 - 13 - 4 - 14 - 5 - 6 - 7 - 8 - 9 - 10;

wherein the reference numerals are disclosed to be:

a steel material (1), a softening by annealing step (2), a lubricating treatment step (3), a cutting step for cutting to a predetermined size (4), upsetting step (5), an annealing step (6), a lubricating treatment step (7), a backward extrusion step (8), a cutting step (9), a finished machine part (10), a wire drawing step (11), an annealing step (12), a lubricating treatment step (13), and a forward extrusion step (14) (see page 1, column 2, line 18 to page 2, column 1, paragraph 1, line 10).

However, JP 61-129246 teaches that the steps illustrated in Fig. 2 are undesirable. JP 61-129246 teaches that the processes illustrated in Fig. 2 are complicated and that because lubricating is necessary after each annealing step, it is desirable to completely omit the intermediate annealing treatment. (see page 2, column 1, paragraph 1, lines 11-19; and see page 2, column 2, paragraph 1, lines 1-9). In fact, JP 61-129246 discloses preferred steps having only one softening by annealing step (2) in Fig. 1. Accordingly, JP 61-129246 teaches away from having a second annealing step as required in claim 1.

JP 61-129246 failed to recognize the advantages of a second annealing step to promote the dispersion of the internal carbide to increase spheroidizing ratio. Further, JP 61-129246 does

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not teach or suggest that the steel material (1) comprises ferrite and pearlite as required in claim 1. JP 61-129246 also does not teach or suggest that the drawing step has a drawing ratio of approximately 20% as required in claim 1. Tomioka et al. (US 3532560) does not remedy the deficiencies of JP 61-129246.

The rejection also stated that one of ordinary skill in the art would have found it obvious that annealing and spheroidizing annealing are functionally equivalent because Tomioka et al. seems to equate annealing to spheroidizing annealing. Applicants respectfully disagree.

Tomioka et al. teaches that, to be suitable for their invention, a steel wire must be first subjected to (1) an annealing treatment, or (2) a spherical annealing treatment (see column 2, lines 5-10). Accordingly, Tomioka et al. teaches that an annealing treatment and a spheroidizing annealing treatment are two distinct treatments. Thus, Tomioka et al. does not teach or suggest to one of ordinary skill in the art that "annealing" is functionally equivalent to "spheroidizing annealing." Further, one of ordinary skill in the art would not understand the teaching by Tomioka et al. to indicate anything more than that the two processes lead to only a suitable starting material. Further, Tomioka et al. does not teach or suggest a process wherein spheroidizing annealing step is applied in promoting the dispersion of the internal carbide, as required in claim 1.

Therefore, claim 1 is patentable over JP 61-129246 in view of Tomioka et al. Claim 3 is also patentable for at least the same reasons as claim 1 from which it depends. Applicants respectfully request reexamination and reconsideration of claims 1 and 3.

Claim 4 was rejected under 35 USC 103(a) as being unpatentable over JP 61-129246 in view of Tomioka et al. as applied to claim 1 and further in view of JP 07-097656. JP 07-097656 fails to remedy the deficiencies of Tomioka et al. and JP 61-129246 stated above. Accordingly, claim 4 should be patentable for at least the same reasons as claim 1 from which it depends. Applicants respectfully request reexamination and reconsideration of claim 4.

Claims 5-9 were rejected under 35 USC 103(a) as being unpatentable over JP 61-129246 in view of Tomioka et al. and further in view of Bach et al. (US 4704166). Applicants do not concede the correctness of the rejection.

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The rejection conceded that JP 61-129246 in view of Tomioka et al. does not teach quenching a blank unloaded from a heating furnace to form a fine martensite in a surface as claimed. However, the rejection erroneously states that it would have been obvious to one of ordinary skill in the art to prepare a blank using a method as disclosed by Bach et al. Even if Bach et al. teaches a process of forming a surface layer of martensite, which Applicants are not conceding, Bach et al. teaches that homogenous carbon steel is desirable and that cementite should be eliminated from the core of the rods (column 3, lines 22-23; column 4, lines 36-39). Further, Bach et al. teaches that formation of cementite is undesirable because "cementite precipitation [impairs] drawability" (column 1, line 23). Accordingly, Bach et al. does not teach or suggest annealing the blank to convert the martensitic structure of the surface into a fine spherodized comprising ferrite and cementite, as required in claims 5-9. Thus, Bach et al. fails to remedy the deficiencies of JP 61-129246 in view of Tomioka et al. Therefore, claims 5-9 are patentable. Applicants respectfully request reexamination and reconsideration of claims 5-9.

Claims 18 and 20 were rejected under 35 USC 103(a) as being unpatentable over JP 61-129246 in view of JP 07-097656 and further in view of Sakai et al. (US 5878323). Applicants do not concede the correctness of the rejection.

The rejection conceded that JP 61-129246 and JP 07-097656 fail to specify the aging step as claimed. However, the rejection erroneously stated that Sakai et al. discloses aging a forged connection rod and that it would have been obvious to one of ordinary skill in the art to add such a step to the teachings of JP 61-129246 and JP 07-097656.

Sakai et al. teaches a method of bonding together two alloy pieces by compression in the same mold so that the pieces are deformed until the meeting surface faces of the pieces are cohered (see abstract). In particular, the age treatment process taught by Sakai et al. is addressed to bonding together two pieces of aluminum alloy (column 13, line 23-26). One of ordinary skill in the art would not reasonably include a process for bonding together two pieces of aluminum alloy into steps of cold-forming a crankshaft, wherein a blank is made of carbon steel. Further, there is no teaching or suggestion that such a step for bonded aluminum alloy pieces would even be effective for a cold-formed blank made of carbon steel. Accordingly, Sakai et al. fails to remedy the deficiencies of JP 61-129246 and JP 07-097656 for claims 18 and 20. Claims 18 and 20 are patentable over JP 61-129246 in view of JP 07-097656 and further in view of Sakai et al.

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Applicants respectfully request a favorable reexamination and reconsideration of claims 18 and 20.

Claims 19 and 23 were rejected under 35 USC 103(a) as being unpatentable over JP 61-129246 in view of Tomioka et al. and further in view of Sakai et al. (US 5878323). Applicants do not concede the correctness of the rejection.

As stated above, the age treatment process taught by Sakai et al. is inapplicable to a cold-formed blank made of carbon steel. Further, Tomioka et al. teaches that their process allows for formation of steel wire such that they "do not require any further heat treatment after production thereof" (column 4, lines 16-17). Accordingly, Tomioka et al. teaches that heat treatment, such as age treatment, is not needed. Accordingly, Tomioka et al. teaches away from including any age treatment step. Thus, there is no motivation or suggestion to combine any age treatment step or process with Tomioka et al. Sakai et al. fails to remedy the deficiencies of JP 61-129246 in view of Tomioka et al. Therefore, Claims 19 and 23 are patentable over JP 61-129246 in view of Tomioka et al. and further in view of Sakai et al. Applicants respectfully request a favorable reexamination and reconsideration of claims 19 and 23.

In view of the above, early issuance of a notice of allowance is solicited. Any questions regarding this communication can be directed to the undersigned attorney, Curtis B. Hamre, Reg. No. 29,165 at (612) 455-3802.



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Respectfully submitted,

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